(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 461 587 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
03.04.2019 Bulletin 2019/14

(21) Application number: **16923862.3**

(22) Date of filing: **16.12.2016**

(51) Int Cl.:
B25B 15/04 *(2006.01)*

(86) International application number:
PCT/CN2016/110306

(87) International publication number:
WO 2018/107454 (21.06.2018 Gazette 2018/25)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **13.12.2016 CN 201621364482 U**

(71) Applicant: **Wei Chins Plastic Enterprise Corp.**
Taichung City (TW)

(72) Inventor: **LAI, Jin-Tsai**
Taichung City (TW)

(74) Representative: **Lang, Christian**
LangPatent Anwaltskanzlei
Ingolstädter Straße 5
80807 München (DE)

(54) INSULATED MULTI-ANGLE RATCHET WHEEL SCREWDRIVER

(57) An insulated multi-angle ratchet wheel screwdriver, comprising: a grip handle (10), a spring (20), a press button (30), a drive head (40), and a pivot joint member (50). The pivot joint member (50) is matched with a seal cover (60) which is made of an insulation material. All exposed metal parts of the handle (10), the press button (30), and the drive head (40) are coated with an insulation layer (70) so as to achieve complete insulation of the whole device, which may be relatively safe to use in an electric environment. Locking the press button (30) into a recessed part in combination with the abutment of a blocking edge (442) may achieve a multi-surface contact, which may significantly increase the stability of the drive head (40) after being locked in.

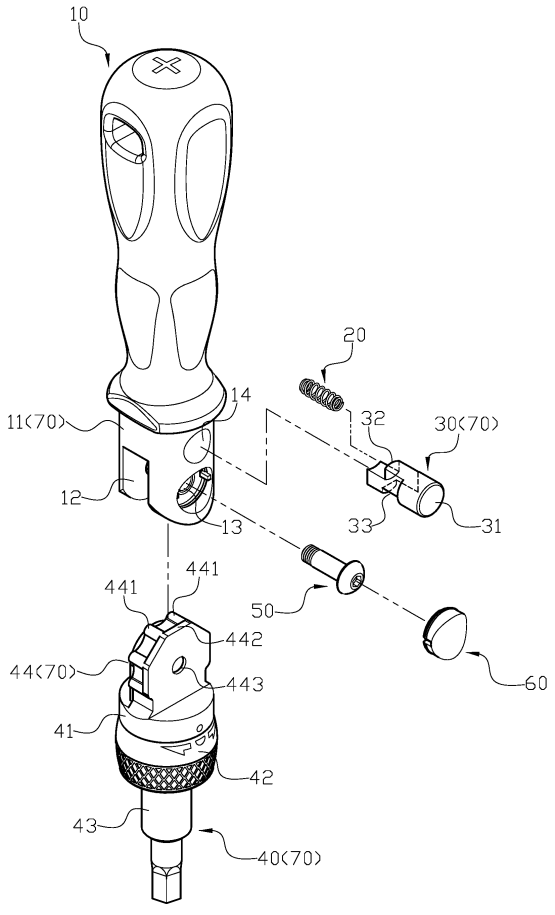

FIG. 2

EP 3 461 587 A1

Description

ABSTRACT

[0001] An insulated multi-angle ratchet wheel screwdriver, comprising: a grip handle (10), a spring (20), a press button (30), a drive head (40), and a pivot joint member (50). The pivot joint member (50) is matched with a seal cover (60) which is made of an insulation material. All exposed metal parts of the handle (10), the press button (30), and the drive head (40) are coated with an insulation layer (70) so as to achieve complete insulation of the whole device, which may be relatively safe to use in an electric environment. Locking the press button (30) into a recessed part in combination with the abutment of a blocking edge (442) may achieve a multi-surface contact, which may significantly increase the stability of the drive head (40) after being locked in.

Technical Field

[0002] The present invention relates to an insulated multi-angle ratchet wheel screwdriver, especially to a completely insulated ratchet wheel screwdriver with a swivelling head.

Background Technique

[0003] Refer to Taiwanese Pat. Pub. No. 428515 whose date of patent is Apr. 1, 2001 and the application date is Aug. 8, 2000, a multi-ratchet screwdriver and a swivelling head are revealed. After analysis of the patent claims and figures thereof, it is found that the multi-ratchet screwdriver has following shortcomings: (1) the parts of the screwdriver are not effectively insulated so that there is a danger of electric shock when the screwdriver is used in electrical environments; (2) the control shaft thereof is used in combination with a steel ball; after the connector being moved, the control shaft abuts against the steel ball and presses the steel ball into the positioning slot of the connector; however, the arrangement of the steel ball makes the whole structure of the multi-ratchet screwdriver more complicated; moreover, only one fourth of the spherical surface of the steel ball is locked so that the multi-ratchet screwdriver has problems of relatively small contact area and poor stability.

CONTENT OF THE INVENTION

[0004] In view of the technical problems of poor positioning force and unavailable isolation of the conventional ratchet screwdrivers, the invention provides an insulated multi-angle ratchet wheel screwdriver.

[0005] The invention provides an insulated multi-angle ratchet wheel screwdriver, comprising a grip handle, a spring, a press button, a drive head, and a pivot joint member. The pivot joint member is used in combination with a seal cover made from insulation material. All exposed metal parts of the grip handle, the press button, and the drive head are coated with an insulation layer.

[0006] A connecting base extends from one end of the grip handle and is provided with a rotary slot. A first pivot hole and a recess are arranged at one side of the connecting base and communicating with the rotary slot. The recess is located adjacent to the grip handle, allowing the spring and the press button to be mounted therein.

[0007] The press button consists of a first end and a second end. An avoiding notch is formed on the bottom of the press button and arranged between the first end and the second end. Two ends of the spring are abutting against the wall of the recess and the second end of the press button respectively after the spring and the press button being placed into the recess of the grip handle horizontally. Once a user keeps pressing the first end of the press button, the press button retracts smoothly and the avoiding notch thereof is aligned with the rotary slot.

[0008] The drive head includes a main body. A connecting rod controlled by a ratchet member is arranged at the main body. A gear-like portion is disposed on one end of the main body, which is different from the end from which the connecting rod is protruding. A blocking edge is connected to two adjacent teeth of the gear-like portion on one side and a second pivot hole is penetrating the center of the gear-like portion. The drive head is mounted into the rotary slot of the grip handle by means of the gear-like portion in such a way, that the second pivot hole of the gear-like portion remains facing the first pivot hole of the grip handle and the pivot joint member is inserted in the first and second pivot hole. The press button can be smoothly locked into a concave portion formed between the two adjacent teeth of the gear-like portion and abutting against the blocking edge. The seal cover is placed over the first pivot hole of the grip handle to seal the pivot hole.

[0009] The pivot joint member is combined with the first pivot hole of the grip handle by screwing.

[0010] The present ratchet wheel screwdriver has following advantages compared with prior arts:

1. All exposed metal parts of the grip handle, the press button, and the drive head of the present insulated multi-angle ratchet wheel screwdriver are coated with an insulation layer so that the whole ratchet wheel screwdriver is completely insulated. Thus the ratchet wheel screwdriver is quite safe while being used in an electric environment.
2. The press button is in contact with multiple planes by being locked into the concave portion and blocked by the blocking edge. Thus the stability of the locked drive head can be improved significantly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Fig. 1 is a perspective view of an embodiment ac-

cording to the present invention;
Fig. 2 is an explosive view of an embodiment according to the present invention;
Fig. 3 is a sectional view of an embodiment according to the present invention;
Fig. 4 is a perspective view of an embodiment being pressed according to the present invention;
Fig. 5 is a perspective view of an embodiment after adjustment according to the present invention; and
Fig. 6 is a sectional view of an embodiment after adjustment according to the present invention.

[0012] In the figures:

grip handle	10
rotary slot	12
connecting base	11
first pivot hole	13
recess	14
spring	20
press button	30
first end	31
second end	32
avoiding notch	33
drive head	40
main body	41
ratchet member	42
connecting rod	43
gear-like portion	44
teeth	441
blocking edge	442
second pivot hole	443
pivot joint member	50
seal cover	60
isolation layer	70

SPECIFIC EMBODIMENT

[0013] In order to learn features and functions of the present invention more clearly, please refer to the following embodiments, the related figures, and the detailed descriptions. However, the embodiments given should not confine the invention.

[0014] First of all, as shown in Fig. 1 to Fig. 3, a ratchet wheel screwdriver according to the present invention includes a grip handle 10, a spring 20, a press button 30, a drive head 40 and a pivot joint member 50. The pivot joint member 50 is used in combination with a seal cover 60 made of an insulation material. All exposed metal parts of the grip handle 10, the press button 30, and the drive head 40 are coated with the insulation layer 70. The grip handle 10 consists of a connecting base 11 extending from one end thereof, a rotary slot 12 formed on the connecting base 11, a first pivot hole 13, and a recess 14. Both the first pivot hole 13 and the recess 14 are disposed on one side of the connecting base 11 and communicating with the rotary slot 12. The recess 14 is located adjacent to the grip handle 10 and used for mounting the spring 20 and the press button 30 therein in turn. The press button 30 is composed of a first end 31, a second end 32, and an avoiding notch 33 formed on the bottom thereof and located between the first end 31 and the second end 32. Two ends of the spring 20 are abutting against the wall of the recess 14 and the second end 32 of the press button 30 respectively after the spring 20 and the press button 30 being placed into the recess 14 of the grip handle 10 horizontally. The press button 30 retracts smoothly and the avoiding notch 33 thereof is aligned with the rotary slot 12 when a user keeps pressing the first end 31 of the press button 30. The drive head 40 includes a main body 41 on which a connecting rod 43 controlled by the ratchet member 42 is arranged. The connecting rod 43 is used for holding a drill bit. The connecting rod 43 can be locked in both directions or running idly in one direction by operating the ratchet member 42. A gear-like portion 44 is disposed on one end of the main body 41, which is different to the end from which the connecting rod 43 is protruding. The gear-like portion 44 consists of a plurality of teeth 441, a plurality of blocking edges 442 each of which is connected to the two adjacent teeth 441 and located on one side thereof, and a second pivot hole 443 is located on the center thereof. The drive head 40 is mounted into the rotary slot 12 of the grip handle 10 by means of he gear-like portion 4 in such a way that the second pivot hole 443 of the gear-like portion 44 remains facing the first pivot hole 13 of the grip handle 10. By inserting the pivot joint member 50 in the first and second pivot hole 13, 443, the drive head 40 is pivotally connected to the connecting base 11 of the grip handle 10 by means of the gear-like portion 44. After the pivotal connection of the drive head 40 to the grip handle 10, the press button 30 is released and then pushed back by the spring force of the spring 20 so that the avoiding notch 33 and the rotary slot 12 of the grip handle 10 are staggered. Thus, the press button 30 can be smoothly locked into a concave portion formed between the two adjacent teeth 441 of the gear-like portion 44 and abutting against the blocking edge 442. The first pivot hole 13 of the grip handle 10 is closed by the seal cover 60 placed thereover. Thereby the pivot joint member 50 is completely hidden by the seal cover 60. Therefore the whole ratchet wheel screwdriver is fully insulated.

[0015] The invention provides an insulated multi-angle ratchet wheel screwdriver. The pivot joint member 50 is connected to the first pivot hole 13 of the grip handle 10 by screwing.

[0016] Refer to Fig. 4 at the same time, while in use, by pressing the first end 31 of the press button 30, the avoiding notch 33 is aligned with the rotary slot 12 and the gear-like portion 44 is released from the press button 30 temporarily, so that the drive head 40 can swivel on the grip handle 10 smoothly. Thus the ratchet wheel screwdriver can be used at different angles while screw-

ing screws and the operation of the ratchet wheel screwdriver is smoother. After the adjustment, the press button 30 is released. Then the press button 30 is locked into one of the concave portions formed between the two adjacent teeth 441 again and abutting against the blocking edge 442 of the gear-like portion 44, as shown in Fig. 4, Fig. 5 and Fig. 6. Now the press button 30 is blocked by the blocking edge 442 of the gear-like portion 44. By being locked into the concave portion and blocked by the blocking edge 442, the press button 30 is in contact with multiple planes. Thus the stability of the locked drive head 40 after can be improved significantly.

[0017] On the basis of the structure of the above-mentioned specific embodiment, following advantages can be achieved: First, all exposed metal parts of the grip handle 10, the press button 30 and the drive head 40 are coated with an insulation layer 70. Thus the whole ratchet wheel screwdriver is completely insulated and is relatively safe while being used in an electrical environment. Moreover, the press button 30 is in contact with multiple planes by being locked into the concave portion and blocked by the blocking edge 442. Thus the stability of the locked drive head 40 can be improved significantly.

[0018] The above-mentioned specific embodiment is just a preferred embodiment for a detailed description of the invention. Therefore, the invention in its broader aspects is not limited to the specific details. Accordingly, equivalent alternatives or modifications which the technicians of this technical field belong to the protection scope of the invention. For the protection scope of the invention, please refer to the claims.

Claims

1. An insulated multi-angle ratchet wheel screwdriver comprising: a grip handle, a spring, a press button, a drive head, and a pivot joint member used in combination with a seal cover made of insulation material; all exposed metal parts of the grip handle, the press button and the drive head are coated with an insulation layer,
   wherein a connecting base extends from one end of the grip handle and is provided with a rotary slot, a first pivot hole and a recess are arranged at one side of the connecting base and communicating with the rotary slot, and the recess is located adjacent to the grip handle, allowing the spring and the press button to be mounted therein,
   wherein the press button consists of a first end and a second end; an avoiding notch is formed on the bottom of the press button and arranged between the first end and the second end; two ends of the spring are abutting against the wall of the recess and the second end of the press button respectively after the spring and the press button being placed into the recess of the grip handle horizontally; the press button retracts and the avoiding notch thereof is aligned with the rotary slot, and
   wherein the drive head includes a main body; a connecting rod controlled by a ratchet member is arranged at the main body; a gear-like portion is disposed on one end of the main body, which is different from the end from which the connecting rod is protruding.; a blocking edge is connected to two adjacent teeth of the gear-like portion on one side and a second pivot hole is penetrating the center of the gear-like portion; the drive head is mounted into the rotary slot of the grip handle by means of the gear-like portion in such a way, that the second pivot hole of the gear-like portion remains facing the first pivot hole of the grip handle and the pivot joint member is inserted in the first and second pivot hole; the press button can be smoothly locked into a concave portion formed between the two adjacent teeth of the gear-like portion and abutting against the blocking edge; the seal cover is placed over the first pivot hole of the grip handle to seal the pivot hole.

2. The insulated multi-angle ratchet wheel screwdriver as claimed in claim 1, wherein the pivot joint member is connected to the first pivot hole of the grip handle by screwing.

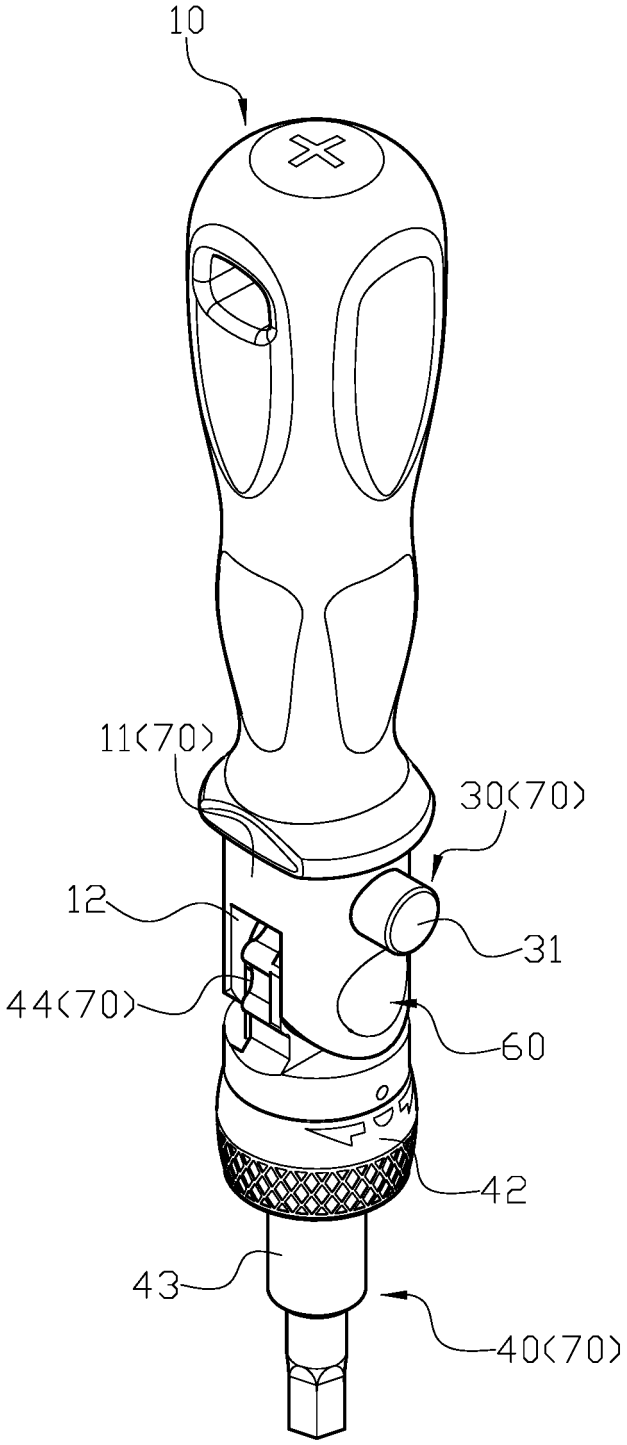

FIG. 1

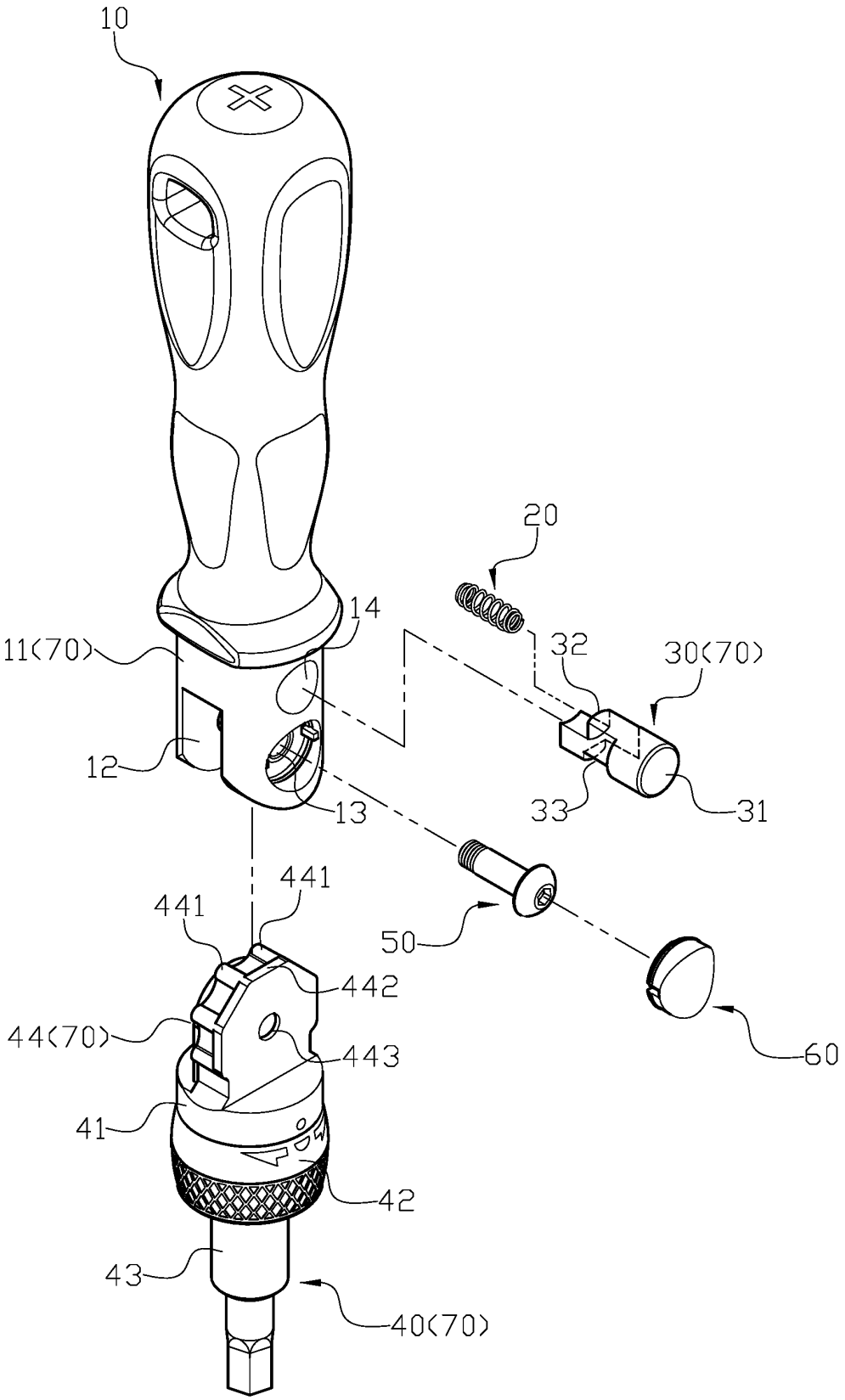
10
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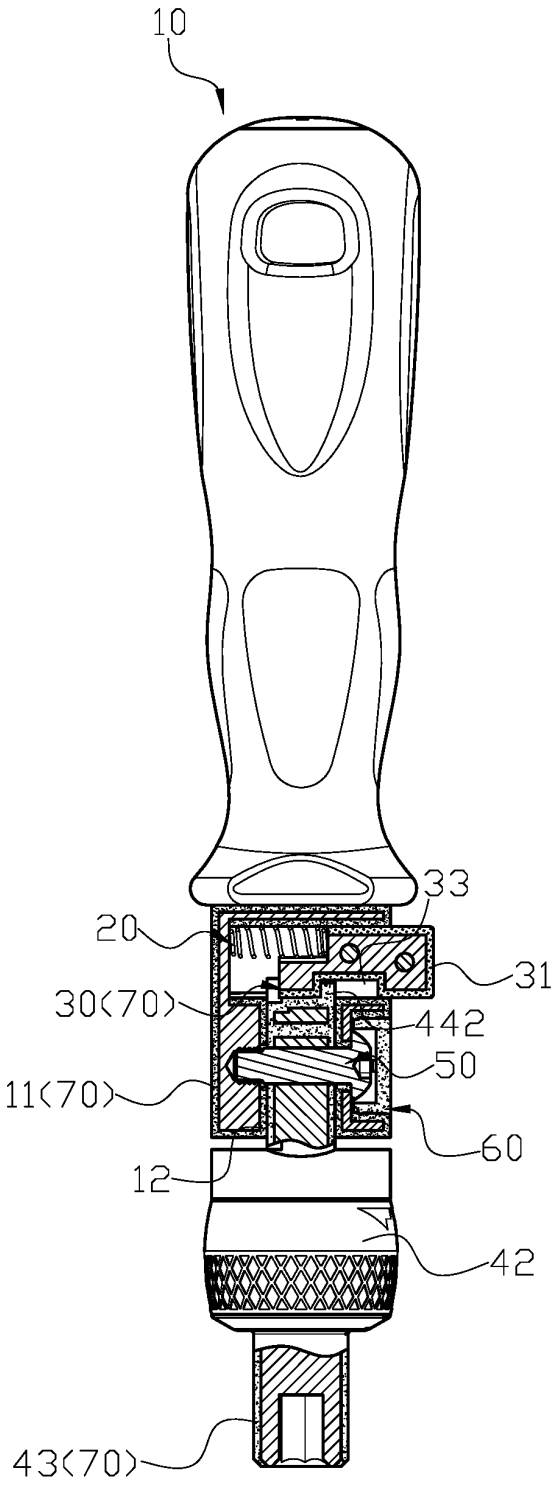
FIG. 2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442
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11(70)
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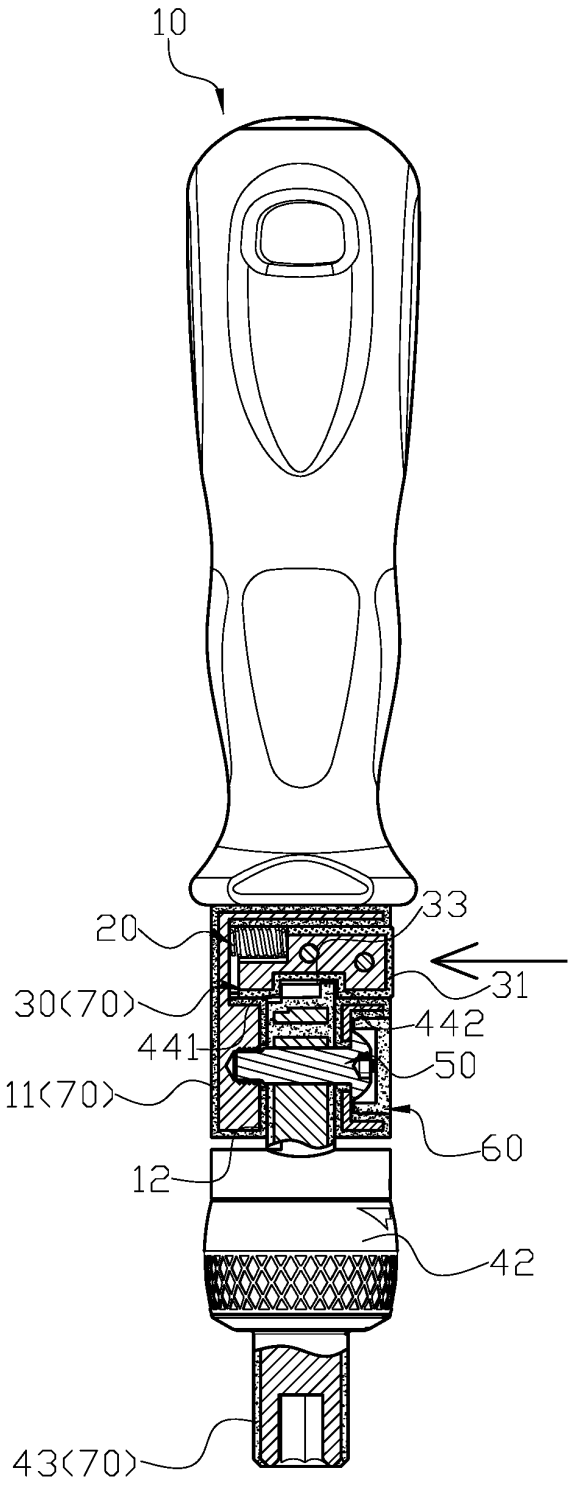
43(70)

FIG. 3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43(70)

FIG. 4

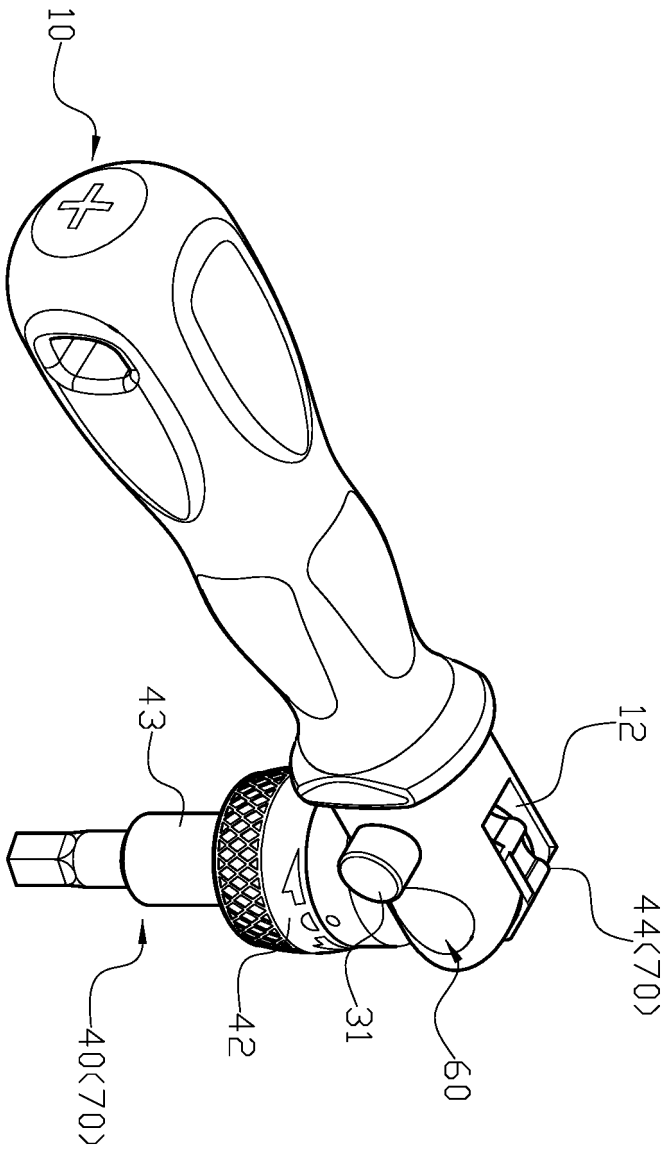

FIG. 5

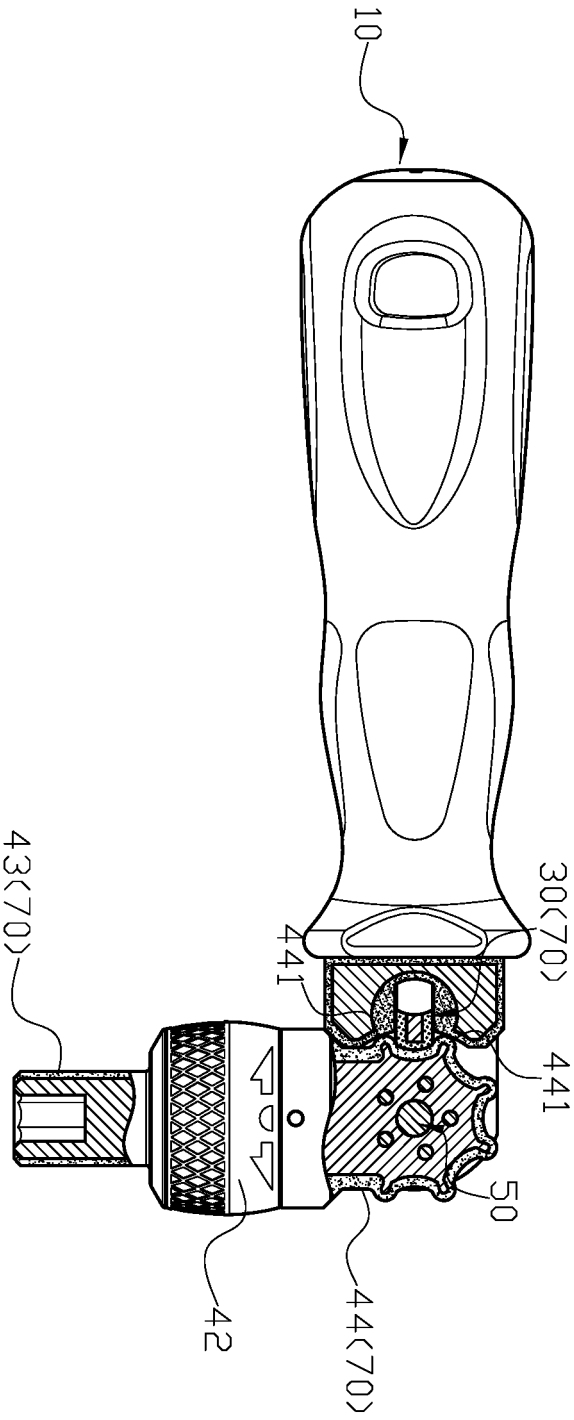

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2016/110306

A. CLASSIFICATION OF SUBJECT MATTER

B25B 15/04 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Databases: CNABS, CPRSABS, DWPI, SIPOABS, CJFD, CNTXT, CNKI, Key words: 威进塑胶企业股份有限公司/PA, 赖进财/IN, 绝缘, 棘轮, 齿轮, 柄, 压钮, 驱动, 枢接, 起子, 弹簧, button, handle, insulat+, ratchet, driv+, rod, head, cover, wrench, gear, spring

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 101618534 A (LAI, Jincai), 06 January 2010 (06.01.2010), description, page 4, last paragraph to page 5, penultimate paragraph, and figures 1-7	1-2
A	CN 2803630 Y (LIAO, Yongquan), 09 August 2006 (09.08.2006), entire document	1-2
A	TW 201014688 A1 (WEI CHINS PLASTIC ENTERPRISE CORP.), 16 April 2010 (16.04.2010), entire document	1-2
A	TW 200950935 A (WEI CHINS PLASTIC ENTERPRISE CORP.), 16 December 2009 (16.12.2009), entire document	1-2
A	US 4873898 A (CHERN, S.), 17 October 1989 (17.10.1989), entire document	1-2
A	US 5873288 A (BEERE PRECISION MEDICAL INSTR. INC.), 23 February 1999 (23.02.1999), entire document	1-2

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
01 September 2017	11 September 2017

Name and mailing address of the ISA	Authorized officer
State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	XIONG, Qian Telephone No. (86-10) 62413024

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2016/110306

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 101618534 A	06 January 2010	None	
CN 2803630 Y	09 August 2006	None	
TW 201014688 A1	16 April 2010	None	
TW 200950935 A	16 December 2009	None	
US 4873898 A	17 October 1989	DE 8900543 U	23 February 1989
		GB 2237228 A	01 May 1991
US 5873288 A	23 February 1999	US 5943755 A	31 August 1999

Form PCT/ISA/210 (patent family annex) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- TW 428515 **[0003]**